



(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : 9911301

Roll No.

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B. Tech.

(SEM. III) (ODD SEM.) THEORY
EXAMINATION, 2014-15
DATA STRUCTURE

Time : 3 Hours]

[Total Marks : 100

- Note :**
- 1) Attempt all questions.
 - 2) All questions carry equal marks.

- 1 Attempt any **four** parts : **5×4=20**
- (a) Write the Push and POP functions in C simulating Push and Pop operations of STACK implemented using an array of integers.
 - (b) Write a program for sorting the array of 10 elements using the Bubble Sort method.
 - (c) Construct a Binary Search Tree from the given values. Consider the first value as the root value. Values: 49, 22, 25, 90, 82, 7, 13, 47, 49, 63

- (d) Convert the given Infix expression to Postfix expression using Stack and show the details of Stack at each step of conversion.

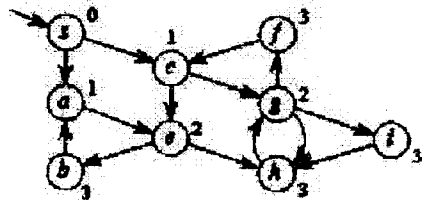
Expression: $(a + b * c ^ d) * (e + f / g)$.

Note : ^ indicates exponent operator.

- (e) Write an algorithm to insert new node at the beginning, at middle position and at the end of a Singly Linked List.

2 Attempt any **four** parts : 5×4=20

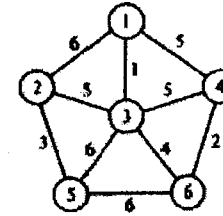
- (a) What happens if the binary search tree is left oriented or right oriented? Explain the problem and give the solution.
- (b) Construct the AVL tree with the following keys- 35,36,80,85,67,89,25,16,10,14,14.
- (c) Give the sequence of disc movements in Tower of Hanoi problem with pegs A, B, C and with 5 discs.
- (d) What is m-way search tree? Construct the B-Tree form the following elements
65, 71, 70, 66, 75, 68,72, 77, 74, 69, 83, 73, 82, 88, 67, 76, 78, 84, 85, 80
- (e) For the given Graph, give adjacency list, storage representation for adjacency List and edge list.



3 Attempt any **four** parts : 5×4=20

- (a) Describe the Breadth First search traversal of a Graph.
- (b) Define data, information, algorithm and data structure. Differentiate linear and non linear data structure.

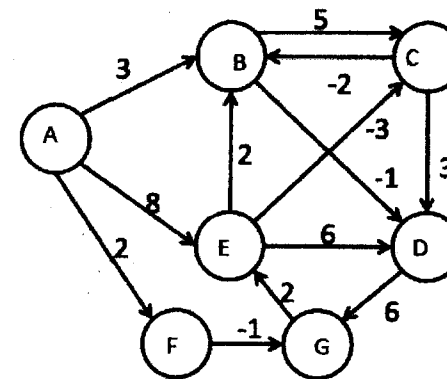
- (c) Write notes on garbage collection and compaction.
- (d) Find MST of the following graph-using Krushal's algorithm



- (e) Create a heap and sort the following element using heap sort 12,8,10,6,4,10,6,11,9,8,14,1.

4 Attempt any **two** parts : 10×2=20

- (a) Find the single source shortest path form the following graph using Dijkstra's algorithm

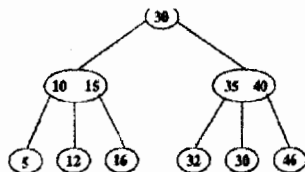


- (b) (i) Write an algorithm for sorting a set of integers using quick sort. What is the case average time complexity of the procedure?
- (ii) following are the in order and post order traversal of a binary tree T-
- (a) DKIBAE GHJFC
- (b) KDIEAGBFCJH
- Construct the tree T.

- (c) Define hash function . What do you mean by perfect hash function? Discuss various methods used for resolving hash collisions.

5 Attempt any **two** parts : 10×2=20

- (a) (i) Define abstract data type. Explain in brief.
 (ii) Obtain the addressing formula for the element $A[i_1][i_2] \dots [i_n]$ in an n-dimensional array declared as $A[u_1][u_2] \dots [u_n]$. Assume column major representation of an array with one word element. Given that α is the address of $A[0][0] \dots [0]$.
- (b) (i) How would you implement a circular queue in c using array? Write routine to Implement operations for it
 (ii) Differentiate between dequeue and priority queue.
- (c) Define B-tree. What do you understand by the order of B-tree?



Show the B-tree after the following operations-
 Insert 43 , Insert 50 , delete 15.